Amendments to the Claims

Claim 1 (Currently amended): A method for modeling cellular metabolism of an organism, comprising:

constructing a flux balance analysis model;

applying logic constraints to the flux balance analysis model~~, wherein the constraints include qualitative kinetic information constraints~~.

Claim 2 (Currently amended) The method of claim 1 wherein the logic constraints include constraints selected to protect against violation of a kinetic barrier.

Claim 3 (Currently amended): The method of claim 1 wherein the logic constraints further include a set of connectivity restraints.

Claim 4 (Original): The method of claim 1 further comprising the step of applying mixed-integer linear programming to solve for a desired metabolic outcome.

Claim 5 (Original): The method of claim 1 further comprising the step of solving for a desired metabolic outcome.

Claim 6 (Original): A method for modeling cellular metabolism of an organism that improves upon a flux balance analysis model, comprising:

constructing the flux balance analysis model; and

applying a plurality of logic constraints to the flux balance analysis model.

Claim 7 (Original): The method of claim 6, further comprising selecting the set of logic constraints to protect against violation a kinetic or regulatory barrier.

Claim 8 (Original): The method of claim 6 wherein the logic constraints are defined by a relationship between changes in reaction fluxes and metabolic concentrations.

Claim 9 (Cancelled).

Claim 10 (Original): The method of claim 6 wherein the logic constraints are represented by binary variables.

Claim 11 (Original): The method of claim 10 wherein a first binary variable represents the presence of a reaction and a second binary variable represents the absence of a reaction.

Claim 12 (Original): The method of claim 6 further comprising applying a computational procedure to identify a minimal set of metabolic reactions.

Claim 13 (Original): The method of claim 12 further comprising selecting a growth rate, and wherein the step of applying a computational procedure is applying a computational procedure to identify the minimal set of metabolic reactions capable of supporting the growth rate.

Claim 14 (Original): The method of claim 6 further comprising the step of applying mixed-integer linear programming to solve for a desired metabolic outcome.

Claim 15 (Currently amended): The method of claim 6 further comprising the step of solving for [[a]]the desired metabolic outcome.

Claim 16 (Currently amended): The method of claim 15 further comprising engineering [[a]]the change in an organism based on the desired metabolic outcome.

Claims 17-18 (Cancelled).

Claim 19 (Currently amended): A system for modeling cellular metabolism of an organism, comprising:

a flux balance analysis model;

a plurality of logic constraints applied to the flux balance analysis model, the logic constraints selected from the set consisting of qualitative kinetic information constraints, qualitative regulatory information constraints, and differential DNA microarray experimental data constraints.

Claim 20 (Currently amended): The method of claim 1 wherein the logic constraints further include qualitative regulatory information constraints.

Claim 21 (Currently amended): The method of claim 20 wherein the logic constraints include ~~logic~~ constraints selected to protect against violation of a regulatory barrier.

Claim 22 (Currently amended): The system of claim 1 wherein the logic constraints further include DNA experimental data constraints.

Claim 23 (Currently amended): A method for modeling cellular metabolism of an organism, comprising:

constructing a flux balance analysis model;

applying constraints to the flux balance analysis model, wherein the constraints include qualitative regulatory information constraints and differential DNA microarray experimental data constraints.

Claim 24 (Previously presented): The method of claim 23 wherein the constraints include logic constraints selected to protect against violation of a regulatory barrier.

Claim 25 (Previously presented): The method of claim 23 wherein the constraints further include connectivity restraints.

Claim 26 (Previously presented): The method of claim 23 further comprising applying mixed-integer linear programming to solve for a desired metabolic outcome.

Claim 27 (Previously presented): The method of claim 23 further comprising solving for a desired metabolic outcome.

Claim 28 (Cancelled).

Claim 29 (Previously presented): A method for modeling cellular metabolism of an organism, comprising:

constructing a flux balance analysis model;

applying constraints to the flux balance analysis model, wherein the constraints include differential DNA microarray experimental data constraints.

Claim 30 (New): A method for modeling cellular metabolism of an organism that improves upon a flux balance analysis model, comprising:

constructing the flux balance analysis model;

applying a plurality of logic constraints to the flux balance analysis model; and

applying mixed-integer linear programming to solve for a desired metabolic outcome.

Claim 31 (New): The method of claim 30 further comprising the step of solving for the desired metabolic outcome.

Claim 32 (New): The method of claim 31 further comprising engineering a change in the organism balance on the desired metabolic outcome.